

Nonsuch Palace. From an Engraving by Hoefnagel.

## LEAD ARCHITECTURE.

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Read before the Royal Institute of British Architects, Monday, 18th January 1904.

THE winning and working of lead, before iron and coal loomed so large, formed one of our three great staple industries—only, in fact, exceeded by wool and tin. A trade in both these metals appears to have existed in Britain before the Romans visited it. While in Spain and elsewhere lead was laboriously mined, in Britain it was found so abundantly, and so near the surface, that laws were voluntarily imposed to restrict the output. Strabo and Diodorus confirm Pliny as to the importance of the British trade both in tin and lead; and no doubt the reputed mineral wealth of Britain alone caused the Romans to covet its possession. They, having already successively annexed the rich mines of Sardinia, Spain, and Attica, became, on reducing Britain, masters of the whole of the silver-lead produce of the known world. Pigs of lead lost in transit and now recovered are evidence that they did not allow any interval to elapse between the extension of their conquests and the working of our mines. Nor can it be supposed that lead-mining was more than interrupted even by such catastrophic events as the departure of the Romans, the settlement of the Angles and Jutes, and the Norman Conquest. In later times some of the Dukes of Cornwall, noted for their wealth and display, derived their revenues from mines, those of Combe Martin contributing especially to the wealth of the Black Prince. Exports of our three staples increased under such warrior merchant princes as the third and fourth

Edwards and Henry VII., all of whom managed their fiscal troubles in a masterful and high-handed manner.

Throughout the Anglo-Saxon and Mediæval periods lead maintained its position as one of our principal exports. During these times practically all the churches and palaces in French and Burgundian territories, at least, were covered with English lead. Until far into the eighteenth century England remained the great source of supply for Western Europe. The lead used for Versailles alone under Louis XIV. totalled to thirty-two million livres. Though in later times our maximum production failed to equal our consumption—exceeding 214,000 tons in 1902—it was not until the early seventies that it began seriously to diminish. From over 80,000 tons in 1870 it had decreased to 65,000 in 1882, 31,000 in 1899, and 24,606 in 1902. Cornwall and Devon, the Weardale, Mendips, South Wales, &c., have practically ceased to produce lead, while for Derbyshire, Durham, Cumberland, and Westmorland the output has fallen to little more than 2,000 tons each per annum. This is not due to exhaustion of the mines, nor altogether to the crushing competition of such leviathan lead-production as that of the United States, with 197,000; Germany, 129,000; Mexico, 84,500; and New South Wales, 70,000 tons; for, singularly enough, the Isle of Man has maintained its production of 3,000 tons, while France, Belgium, and Italy, in no better position than ourselves, have increased their outputs to 16,000, 15,500, and 20,500 tons respectively. Our imports of ore for 1902 were less by far than in 1901, while metallic lead increased from 218,060 to 231,813 tons. Our chief remaining customers are precarious Russia, which took 6,500 tons, and France, 2,000 tons.

To uncivilised man lead was useless for war, the chase, or preparation of food. Its existence was barely known in the later Bronze and Iron Ages. Its early history has been dealt with by Lethaby generally, and by Gowland more exhaustively, in *Archæologia*. Its entry into the domain of architecture was most modest. The Greeks, even in the Mycænean age, used lead plates for clamping door-jambs to the walls, and later for dowelling masonry and attaching bronze enrichments. The oft-quoted statement by Herodotus that lead and iron dowels were used for clamping the stones of a bridge over the Euphrates, and by Diodorus that it helped in the construction of the hanging gardens of Babylon, have not been borne out by discoveries.

The properties that make lead specially valuable, and distinguish it from all other metals, are: that it is so yielding that it has been used for seals; that it can be cut with a knife and joined again either with the blowpipe or soldering iron; it can be melted in a ladle and cast in any matrix without special apparatus, or hammered with a mallet or bent by the hand. Capable of producing the most delicate and lacelike effects, or of covering with an impervious sheath the most extensive buildings, it equally defies the ravages of time and the corroding influences of air or of water. It succumbs to the attacks of fire alone, and even then only the workmanship expended upon it is lost. Under the murky pall of our great cities its hue deepens to a sombre black, but if weather-beaten in purer air it oxidises to a silvery white, producing contrasts of light and shade which are exquisitely beautiful. Formerly richer effects were obtained by gilding and painting in chevrons of colour or powdered devices, or by varying the surface with inlays of tin, or incising patterns and filling them with minium, white oxide, or black asphaltum. It quickly tarnishes, but freshly melted or cleaned its surface is lustrous as silver; and this, if it were worth while, might perhaps be preserved by coating it with vitreous glaze dissolved in fluoric acid.

Its pliant texture suggested to the Greeks its first decorative application in architecture. An Ionic capital from the Temple of Ephesus, in the British Museum, has its volutes inlaid with a fillet of lead. The idea of inlaying lead into stone may have reached the Anglo-

Briton, the most expert metal-worker of that time, from the East. With abounding supplies of lead he did not neglect this means of decoration. William of Malmesbury, writing probably about 1135, describes an ancient pavement in Glastonbury Abbey as formed of "stones designedly inlaid with triangles and squares, and figured with lead, under which I believe

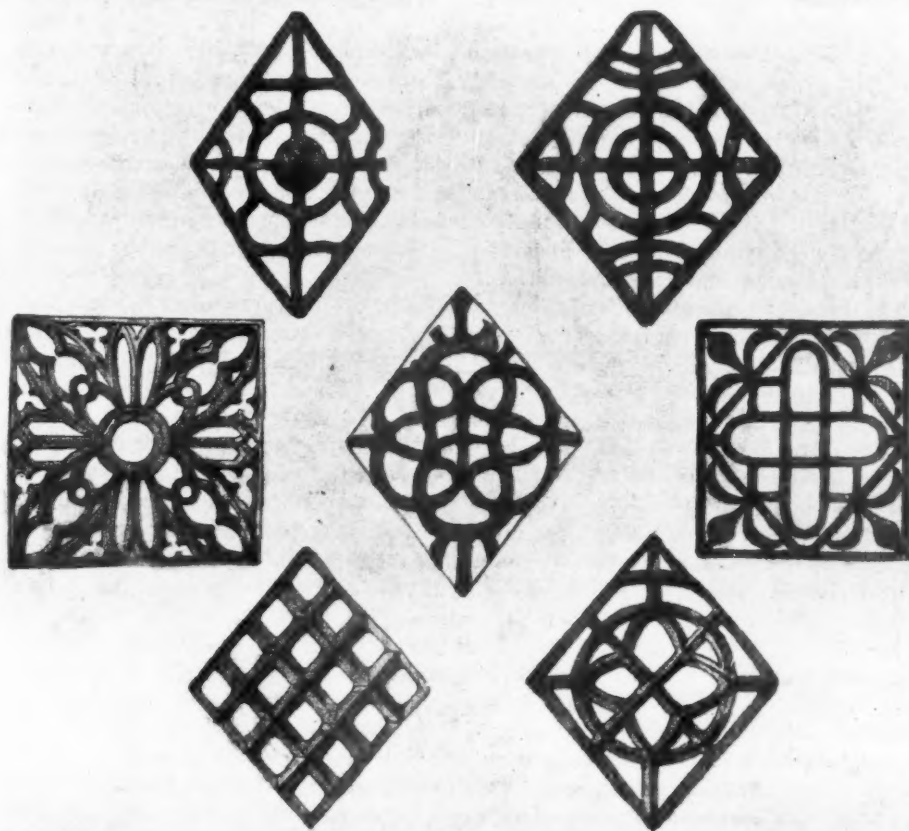


FIG. 1.—LEAD VENTILATING QUARRIES FROM HAMPTON COURT PALACE AND HADDON HALL.

some sacred enigma to be contained." The finest existing example, really a superb specimen, of fourteenth-century work is that now in the Church of St. Remi of Rheims. The stone slabs are each about two feet square, placed diagonally, and each with an exquisitely drawn figure-subject inlaid within a quatrefoil frame and fine geometric border. An excellent illustration was published in the *Building News* for 9th October 1874. Though unquestionably refined in effect, it could not hold its own against the more richly coloured *opus sectile*, inlaid marbles,

or encaustic tiles needed for the gorgeously coloured interiors of the period. A renewed appreciation of black and white for pavements was reserved for a later date. Similarly inlaid stone slabs with effigies and inscriptions outlined in lead, like that in St. Mary Redcliffe, Bristol, were eclipsed by slabs of polished Purbeck marble or alabaster, inlaid with plates of incised brass, often gilded and enamelled. A sparing use of lead was also made in ceilings and vaultings, where the gilded stars are of lead. The pomegranate pendants and leaves at the intersections of the geometric ceiling to Cardinal Wolsey's cabinet at Hampton Court are of lead, like the enrichments to the ceiling of the Chapel Royal, St. James's. Mr. John Jackson indeed informs me that even as late as Charles I. it is not uncommon to find the enrichments of moulded plaster ceilings in lead.

The glazier also was a great consumer of lead; and windows, like those in Salisbury Cathedral, often depended for the decorative effect entirely on the grace and intricacy of their leaded lines. Very beautiful plaques of perforated lead replaced one or more of the quarries of a window for ventilation. They are usually lozenge-shaped, but may also be square or round, and are met with in the offices and corridors of Tudor buildings, such as Hampton Court and Haddon, in considerable variety. A square example of the fifteenth century, illustrated in the twelfth volume of the *Archæological Journal*, page 105, and another from Hampton Court are included in our illustration, which comprises others of the lozenge-shape from the same palace and from Haddon [fig. 1].

The great use made of lead for fanlights and balusters by the brothers Adam is familiar to all. An illustration from the original drawing of the time, made and no doubt executed for Drapers' Hall, is interesting as having the price noted upon it—an exceedingly moderate one [fig. 2].

The simplest and most natural method of using decoratively a metal so fusible as lead is to cast it in moulds. The Greeks used it in their best days in this way for weights, ornamenting these, as may be seen in Lethaby's drawings, in the same beautiful and artistic manner as their coins. No mode of preparing lead for use, except casting in sheets and hammering these out, was known until late in the Middle Ages. The pigs always, and sometimes the pipes, were cast with inscriptions in relief, to which supplementary words and numerals might be added by incising. Inscriptions were incised on tablets of lead by Egyptians and Assyrians, Greeks and Romans, the latter even producing books of lead. There are Anglo-Saxon inscriptions on the cover of a book of lead. Since then tablets of every description for commemorative purposes have been produced in lead and in all ages, both with inscriptions incised and in relief.

The Romans first employed a method of decoration used later by Sussex and other mediæval ironfounders. Small objects in relief, such as escallop shells, beaded rods, plain rings, &c., were impressed as decoration into the beds of sand upon which the sheets were cast. Quite rich effects were produced by skilful arrangements of these, and are seen on Romano-British coffins and cists. Much more rarely they cast decorative objects in moulds specially prepared, like the well-known cup in the British Museum. Some richly decorated lead coffins were found under the pavement of the Temple Church, four illustrated by Edward Richardson in 1845; and many mediæval cists and minor objects in lead, decorated with moulded ornament in relief, are scattered in museums.

The chief uses of lead in architecture, however, are in relation to water, either with a view to its inclusion or exclusion. The plumber's craft, as the name implies, depends solely on lead, which, whether to contain or conduct or exclude water, stands without a rival. The craft was first mastered on a grand scale by the Romans, but not till after their conquest of Britain. There is even reason to assign to the mystery a British origin. Pliny comments

on the vast quantity of lead used in sheets and pipes for supplying water to cities and baths, but the quantities used in his day were trifling to those absorbed for such purposes under Domitian, Nerva, Trajan, Severus, Caracalla, and their successors down to the third century. In England lead pipes have been found in Roman foundations, and at Bath is a massive water channel of lead an inch thick. During the Middle Ages the great ecclesiastical establishments were unsparing in its use, and Wolsey only followed contemporary custom in bringing water from a distance of three miles in lead pipes to his palace at Hampton Court. These mains weighed 15 lb. to the foot, and, at the present price of lead and value of money, would have cost some £50,000, according to Lawes. It is interesting to note that the pipes were made

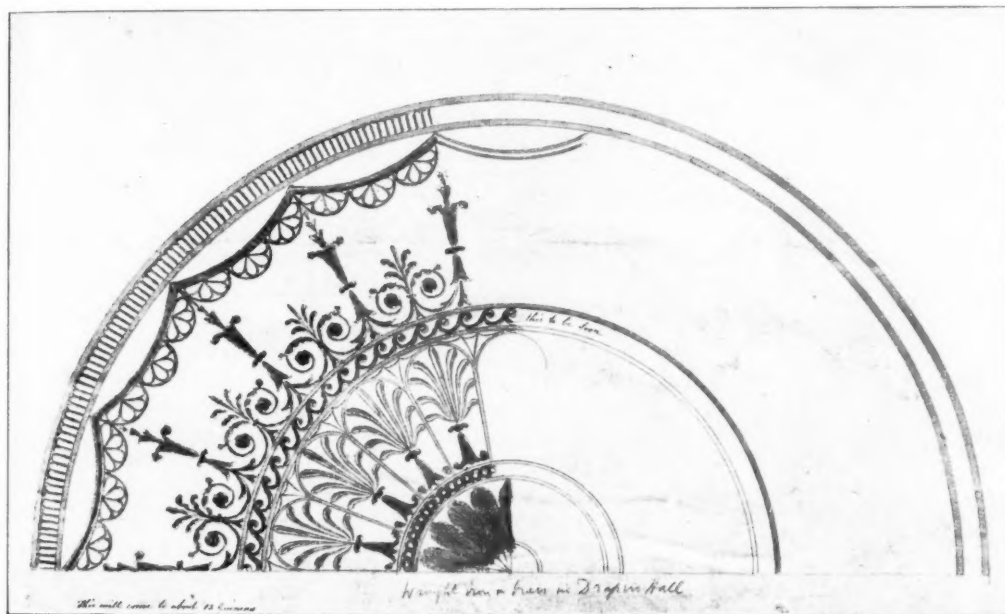


FIG. 2. FANLIGHT. From an original drawing by the Adam Brothers for Drapers' Hall.

exactly as the Romans made them, the lead being cast into sheets, turned over, and united at the edges by burning, without solder. Water was brought into London houses by lead pipes in 1582—for the first time—by Peter Morris, a Dutchman.

That extensive use was made of it in Anglo-Saxon times is evidenced by Turketul covering even his out-buildings with lead, including a bath room, in 978. The contemporary metal work renders it probable that their lead work was not undecorated. A small lead cistern in the Lewes Museum, of Anglo-Saxon make, illustrated by Lethaby, bears a triangular panel of interlaced ornament. There are about thirty fonts of lead preserved in England, and, though none actually date from before the Norman Conquest, they show the English modes of decoration.

Leaden spouts for relieving the gutters formed at times a picturesque feature in mediæval buildings. Of greater interest were the conduits or central distributing fountains which generally occupied some accessible place in one of the courts of every princely dwelling. Unfortunately none perhaps now exist, but there are records of those formerly at



Westminster, Richmond, Hampton Court, Windsor, Nonsuch, &c. Most of these were under canopies, like so many still existing on the Continent, and lead entered very largely into their construction. One of the earliest was erected by Henry III. in Palace Yard, and the latest by Henry VIII. at Windsor, in 1555, to which the water was conducted from a distance of five miles. A dragon spouted water under a gorgeously decorated canopy of lead-work. Unlike wells, these necessitated bringing the supply from a higher level or a water tower. The supply to the Standard in Cornhill, with its decorative lead-work and four water-spouts, was carried over the steeple of St. Magnus'. The great Westeheap conduit of 1285 had a lead cistern battlemented with stone, the water being conveyed to it in lead pipes from Paddington. That of Gracechurch Street was modelled with representations of the nine worthies, comprising Henry VIII. and his son. The renewing of their painting and gilding on the entry of Philip and Mary cost the city a "fifteenth."

The decorated tank or cistern for storing rain water, still a familiar object, may be of great antiquity; but the earliest preserved, of the sixteenth century, bearing "E.R." and royal arms, has been figured in *The Builder* [in 1862, page 602]. Only about one-tenth are of the seventeenth century. An unusually well-modelled example of 1685, bearing the arms of the Fishmongers' Company, and now belonging to Mr. Merthyr Guest, is illustrated as an example of the degree of relief that may reasonably be applied to panelled lead-work [fig. 3]. Between Grosvenor Square and Bond Street, on the south side, I observed eight of these old cisterns in areas—an indication of the vast number that must still exist. Still in association with the tank cisterns may sometimes be seen in country houses the cistern-like heads to the rain-water pipes which fed them. Examples of the latter, of sixteenth-century date, are far from rare, those at Hampton Court, with the cipher of Henry VIII. and Tudor badges, being probably the earliest remaining. Nowhere, perhaps, can a greater variety be seen than at Haddon, while the most elaborately decorated are at Oxford, in St. John's College and the Bodleian. There are good specimens at Charlton, and, indeed, there are few country houses of Tudor or early Stuart date without them. In those old artistic days even the pump was made a vehicle for decoration, like that formerly in Leathersellers' Yard, which was surmounted by a mermaid pressing her breasts, out of which wine ran on State occasions.

Besides the old conduit fountains intended for everybody's use, others of lead were at a later date put up in gardens and in courtyards purely for decoration, but nowhere equalling in magnificence those of Versailles and the Trianon.

Here our references to lead-work in architecture, connected with the supply of water, cease, reopening, let it be hoped, a vast field of art possibilities to the plumber.

In the seventeenth and eighteenth centuries much of the purely decorative statuary produced in England was of lead, especially the massive equestrian statues, the first of which, that of Charles I., by Hubert Le Scur, was cast near Covent Garden in 1633, and erected by Charles II. at Charing Cross in 1674. Le Scur was a pupil of John of Bologna, and was in 1630 attracted to this country, where he died. The figure—horse and man—is still the finest we possess. A second, that of George II., so disgracefully mutilated and destroyed in Leicester Square, came from the Duke of Chandos' estate at Canons, a museum of lead statuary, and was placed in the Square in 1754. There are several of William III. of lead in the provinces and Ireland. Statues and vases were also made in immense quantities for the garden, where lead reigns supreme. Softer and greyer in tone, more yielding, less costly, and less pretentious than bronze or marble, lead seems, above all other materials, to lend itself to this purpose. It is an English domestic metal, suited to our climate and surroundings. A gentleman I sometimes visit has between four and five score of leaden statues dispersed over his extensive grounds. They consist of reproductions from the antique; of eighteenth-century

renderings of gods and goddesses; and of more modern subjects such as musicians, dancers, mummerys, skaters, shepherds and shepherdesses, gardeners, &c., in contemporary costume. This latter group is by far the most interesting, many of the figures being conspicuously dainty, surpassing in elegance and refinement contemporary productions in biscuit and porcelain. The majority of these were probably produced in the two celebrated Piccadilly ateliers, though there must always have been a considerable importation from Holland. These are all of life size; but groups of heroic size, Cain slaying Abel, Hercules and Cacus, &c., are sometimes met with, like the set of four at Harrowden. The vases range in style from that of the Queen Anne period to that of the brothers Adam, and are most massive or very lightly cast. In a fine

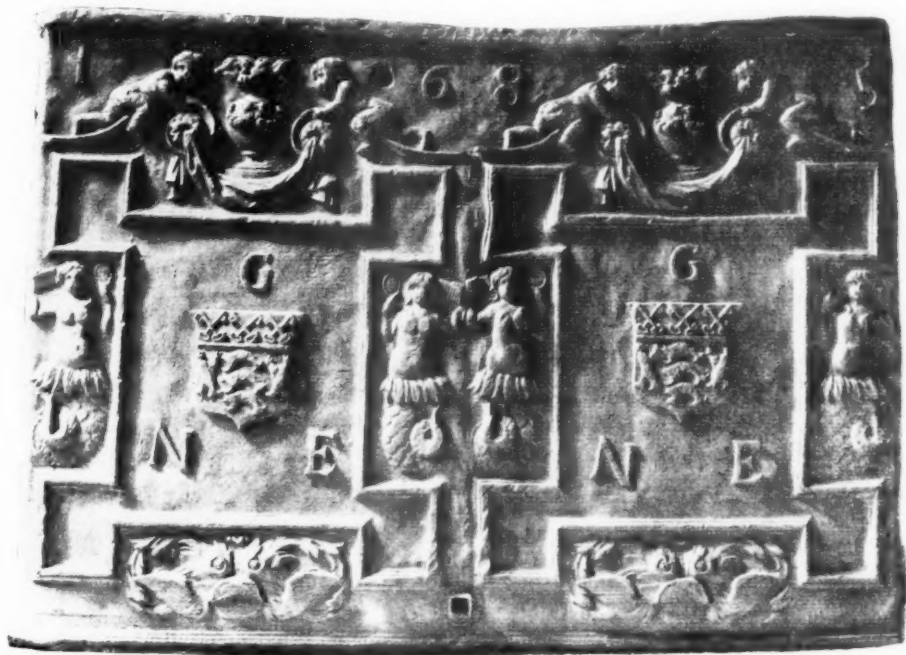


FIG. 3.—A LEAD CISTERN WITH THE ARMS OF THE FISHMONGERS' COMPANY, IN THE POSSESSION OF MR. MERTHYR GUEST.

example at Belyoir all is cast except the body, decorated in embossing with a Bacchante procession. Some of the finest examples grace the piers of entrance gates, as do lions, stags, sphinxes, heraldic beasts, &c.

We now come to our subject proper for this evening, Lead Architecture.

From Homer to Virgil, through Western Mediaeval and Oriental romances, down to Spenser in the *Fairie Queene*, traditions of architecture expressed in metal have been dear to the poets, who have dreamed of brazen towers and castles and magic palaces resplendent with gold. Artists, like the painters of the walls of Pompeii, have also revelled in an architecture so graceful and slender as to suggest either metal or the impossible. Herodotus, bringing us from these baseless fabrics to fact, narrates that the inmost of seven circumvallations of Ecbactana was sheathed in gold, and the penultimate in silver. Babylon possessed its hundred gates of solid bronze, besides those of the Palace of the King and of the Temple of

Belus, and many others which opened on the river. Pliny tells us that, besides its world-famed Colossus, Rhodes possessed one hundred other statues of colossal size. The peoples of antiquity vastly fancied gigantic constructions of metals, a taste by no means unknown to Italy and Germany of the Middle Ages. Nevertheless, the intrinsic value of even the basest metals has sufficed to ensure the destruction of objects into which they enter. Two only, apart from perishable iron, have ever been possible in architectural construction with us: copper, with its alloys, and lead, neither of which has at any time been of conspicuously small value. The Romans used bronze, until the conquest of Britain, for covering any peculiarly magnificent building, such as the Pantheon. Afterwards they used lead, Eusebius the Pope speaking of lead roofs in the third century; the domes of the Holy Sepulchre and St. Sophia being still so covered. The Roman occupation notwithstanding, English buildings under the Saxon kings seem rarely to have been constructed of brick or stone. In Iceland, a country bare of wood, and colonised by people as civilised as the English, but which has stood still since its gréat literary period, practically all the houses, away from Reykavik, are still of peat, both roofs and walls. With us, in a wooded country, they were of wattle or logs. Thus in the seventh century the casing of the wattle minster of Glastonbury with boards was an event to be chronicled. So with the hewn oak church of Lindisfarne, thatched with reeds. With lead plentiful, such structures could immediately be converted into weather- and water-tight dwellings by the not difficult process, to those possessed of money, of sheathing them in lead. The roofing, in the seventh century, of the Church of York with lead by Wilfrid, and the sheathing of that of Lindisfarne by Eadbent, both walls and roof, must have been new and unusual occurrences to have been chronicled by Bede. Only the remarkable events are chronicled, and I have not hitherto met with other statements as to lead-coverings to buildings until Turketul, in the tenth century, sheathed even his out-buildings and bathroom, of planed boards, with it. The blank, however, is partially filled by Viollet-Le-Duc, who states that churches and palaces were at this time entirely covered with lead, and in France artistically wrought. The lead came from England; perhaps the artificers also. To quote from Lethaby: "In Saxon England lead was a staple commodity for export, and used in great quantities at home. English merchants of lead and tin are mentioned as attending the French fairs from the time of Dagobert." Again quoting: "When, about 1090, the roofs of Coutances Cathedral had been destroyed, Geoffrey, the bishop, sent to England and called Brisenetus, the plumber, to make afresh the lead-work of the roofs and tower, and to replace a gilt weathercock." English influence at this time, in the person of Aleuin, was paramount at the Frankish Court.

Edward the Confessor built in stone, if few did before him, and perhaps the illuminations to manuscripts in which architecture begins to appear, unless wholly fanciful or reminiscences of Rome, chiefly represent his buildings. Palaces and churches are seen with pillars and arches supporting domed, curving, turreted, and gabled roofs, of scale pattern, possibly of lead, perhaps only shingled, surmounted by obviously metallic vanes and finials. Still churches of wood were built up to the time of the Conquest and even later; and in remote Elgin the great Church of St. Andrews at Pluscarden was built wholly of lead as late as 1378.

Necessarily, with the introduction of stone and brick architecture, sheathings of lead, so desirable for wattle and rough timber buildings, became useless as a covering to any part of the structure except the roof, to which thenceforth it was relegated. At first neither the Romanesque church nor the English battlemented and flat-roofed castle afforded much scope for a display of lead-work, but with the development of pointed church architecture in the thirteenth century came ample compensation. The roofs rising to a great height and becoming increasingly rich, with turrets, *fîches*, crestings, finials, buttresses, parapets, crockets,



gargoyles, and, above all, the lofty steeples, often clustered in threes, as at Lincoln, Ripon, and Canterbury, soaring nearly 500 feet skywards, absorbed more lead, and afforded greater areas for display than ever. In still more extravagant France, the lead always coming from this side the Channel, the roofs appear to form almost half, and that by no means the least picturesque half, of many of the great sacred edifices. The laying of the lead in strips, vertically or diagonally, formed with their rolled overlaps, fretted lines of shadow on the bleached white surfaces, a sufficient decoration. But the taste of the period demanded greater, and even an enamel-like richness. Stowe describes the bell tower of the priory church of the house of St. John as a most curious piece of workmanship, "graven, gilt, and enamelled, to the great beautifying of the city, and passing all other that I have seen." This was destroyed under Edward VI., while the clock-tower of St. Paul's School, with its leaden spire, was won from Henry VIII. by a throw of the dice and sold. Some of the cathedral spires and roofs in France are said still to retain traces of their former gorgeous decoration in gold and colours. This part of the subject, however, has been so often and ably treated, that it can here be passed over.

The Wars of the Roses having broken the military power of the nobility for ever, kings no longer needed to live in fortresses, but in palaces surrounded by "pleasaunces" in place of ramparts and moats. Henry VII., in spite of his usual parsimony, availed himself to the full of this privilege, rebuilding the Palace of Sheen after its destruction by fire in a most sumptuous manner. This seems to have been the earliest revival of great displays of lead in domestic architecture in England, since the roofing with lead of a building earlier in the century had resulted in its being distinguished as Leadenhall. Unfortunately no representation of this building seems to exist until it was decayed; but of Richmond Palace several views are known. Though the structure was of brick, the roof was a forest of turrets, octagons, pinnacles and finials, gold and azure, with the King's arms. The vanes surmounting them were so numerous that "as well as the plesūnt sight of them as the heryng in a windy day was right m'vellous to knowe and understand." Special ornaments to the building were the turreted lanterns over the great hall, the clock-case at the west end, the lantern leaded and embattled with fourteen turrets over the privy lodgings, a round structure four stories high, called the Canted Tower, embattled and all covered with lead; besides the Chapel, Queen's and Prince's Closets, Hall, Middlegate, and Kitchen, decorated, embattled, covered with lead, and all equally "special ornaments" of the building. There was also a pleasant fountain of lead in the central court. These particulars are taken from the Parliamentary Survey of 1650. A no less lavish use of lead was made by Wolsey and Henry VIII. in their brick-built palace at Hampton Court. Though not completely destroyed like Richmond, it is shorn of the lead-covered cupolas, octagons, turrets, and louvres, bedecked with finials and pennons, all glittering in gold and armorial bearings, which rendered it for the time the most attractive sight in all England.

But it was only where timber framing entered largely into the construction that the lead was carried down below the roofs and a truly lead architecture could be revived. Shortly after the birth of his son, Henry commenced to build, as an appanage of Hampton Court, the rural retreat of Nonsuch, a veritable palace of lead, dazzling the imagination and baffling description. A German, visiting England in the time of Elizabeth, describes it as built with an excess of magnificence and elegance, even to ostentation. "One would imagine everything that architecture can perform to have been employed in this one work; there are everywhere so many statues that seem to breathe, so many miracles of consummate art, so many casts that rival even the perfection of Roman antiquity, that it may claim and justify its name of Nonsuch, being without an equal." Even the prosaic Parliamentary Survey of 1650 waxes

almost eloquent over its beauty. The lower story was freestone, and the higher of wood "richly adorned and set forth and garnished with variety of statues, pictures, and other antick forms of excellent art and workmanship, and of no small cost." It is difficult to ascertain exactly how much was lead-work, but the stanchions and outposts of the Banqueting Hall, three stories high, and its lantern were "all covered with lead," as were the whole of the wooden battlements, perhaps like those at Windsor, "the great grace and special ornament to the whole building." The upper stories, at least, were "buted round with frames of wood covered with lead," and these with the turrets, water-tower, clock-case, &c., "are the chiefe ornament of the whole house of Nonsuch." I have examined the building accounts in the Record Office, but they only refer to the structure, and do not therefore comprise more interesting details. It was left unfinished by Henry, and on his death was completed by the Earl of Arundel. Mr. Brewer's fanciful restoration, published in *The Builder*, is perhaps too florid, and the illustration on Speed's map of Surrey too poor. The illustration shown [see *headpiece*] is part of an engraving by Hoefnagel of Queen Elizabeth's visit to Nonsuch, in which the building forms almost a background. To restore its beauty we must imagine the gardens, lovely with lilacs, then a great rarity, its fountains of birds spouting water, the pyramid of marble with concealed pipes to playfully souse the unwary, and the pleasant grove of Diana, where Actæon formed a most agreeable fountain.

This which no equal has in art or fame,  
Britons deservedly do Nonsuch name.

The palace with all its glories was presented by Charles II. to Barbara, well named, Duchess of Cleveland. The temptation of the lead, so often irresistible, proved so to its covetous owner, and fell a prey to the greedy wrecker. But for the intrinsic value of its materials, especially the lead, the palace might not have perished. It has shared the fate of many others. Passing not long since the fine park of Stallbridge, with its extensive boundary walls and avenues and massive gate piers, I inquired what had become of the house. The tale I heard was that a covetous agent had reported that the land could not be let because of the house, and retired with no mean fortune from the sale of the lead.

One other example of lead architecture has to be described. In 1491 Thomas Wood, a goldsmith and sheriff of London, built a row of shops and dwellings in Cheapside fronted with lead, which every chronicler speaks of as beauteous and glorious to behold. It was built expressly to accommodate goldsmiths: the front was gilded, and it acquired the name of Goldsmiths' Row. Successive monarchs made it their care that its symmetry should not be marred by the intrusion of any more vulgar trade. Stowe describes it as "the most beautiful Frame and Front of fair Houses and Shops that be within all the Walls of London or elsewhere in England; commonly called Goldsmiths' Row, between Bread St. end and the Cross in Cheap. It containeth in number 10 fair dwelling Houses, and 14 Shops, all in one Frame, uniformly builded 4 Stories high, beautified towards the Street with the Goldsmiths' arms; and the likeness of Woodmen, in memory of his name, riding on Monstrous Beasts. All which is cast in Lead, richly painted over and gilt." It was regilt in 1594 by Sir Richard Martin, goldsmith and Lord Mayor, and destroyed in the Great Fire of 1666. No contemporary representation of it exists; but a picture, attributed to Theodore Bernardi and destroyed in the fire at Cowdray, represented the young King, Edward VI., passing it on his way from the Tower to Westminster in 1547. This was happily engraved by the Society of Antiquaries shortly before its destruction [fig. 4]. Unfortunately the façade is almost concealed by the gala draperies hanging from the windows, among which is a tapestry of St. George on horseback, after Raphael. The shops are open as in bazaars and laid out with the goldsmiths' wares,

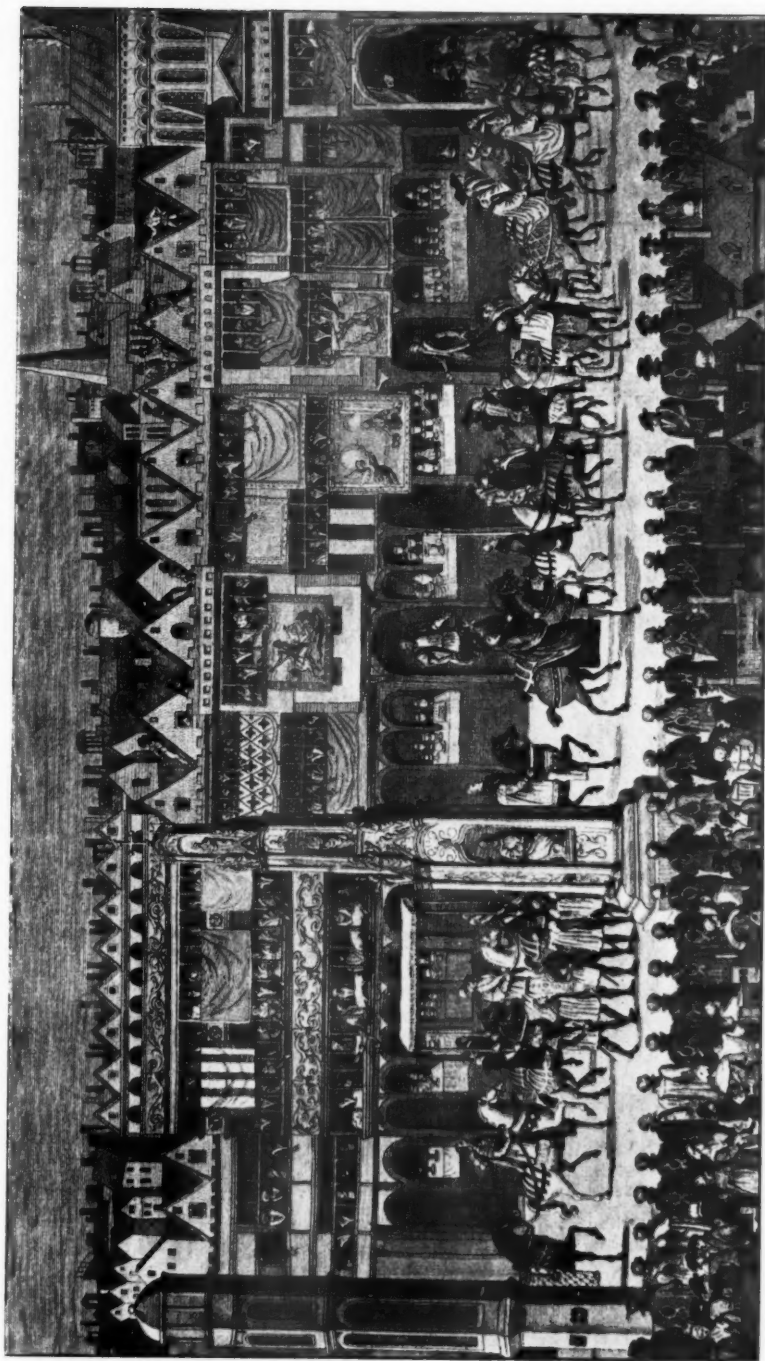


FIG. 4.—VIEW OF GOLDSMITHS' ROW, CHEAPSIDE, SHOWING THE CROSS AND GREATER CONDUIT, *temp.* EDWARD VI.  
From the Engraving published by the Society of Antiquaries.

inviting the wholesale plagiarism that was a feature of the times. On an alarm these were hastily gathered in, and the commotion and clattering of the shutters is described by an eye-witness when Wyatt thundered at the City gates. The two conduits are represented whose regilding was so costly to the city on gala occasions; and the cross, later so defaced by the iconoclasts that Elizabeth compelled the City to re-erect it in wood, covered with gilded lead. An ancient shop at Lingfield preserves almost precisely, except that it has been glazed, the arrangement seen in the picture.

Lead fell into disuse in consequence, it was said, and of the introduction of some kind of plaster from Italy, more enduring, and capable of more artistic treatment. Many would like to know that plaster.

This concludes our brief sketch of lead architecture in the past. It suffices to show that in Anglo-Saxon times the principal buildings, though of perishable materials, were encased in imperishable lead. Like all other metal-work handed down by the English, it was probably treated in a decorative manner. Encasing buildings with lead, except as regards the roof, was discontinued with the introduction of stone and brick architecture by the Normans, but was revived under Henry VII., when it again became safe to resort to timber construction. The later buildings erected were, we know, cased in lead sumptuously modelled and enhanced by gilding, or parcel gilding, with colours.

Without actually sheathing buildings in lead good effects may be obtained by its use. The circular medallions with busts on the front of Ham House are a great relief to the brickwork, and the large rain-waterpipe-heads often form important features in our Renaissance buildings. Lead might be used at times with advantage for frames and sills of windows and porches, medallions of arms, inscriptions, balustrades, &c., and also for panels, the plinths for statues, and other portions of monuments; and works of art can be produced in it with great facility.

It is specially decorative in gardens.\* Its use might be extended with advantage to garden balustrades, temples and tea-houses, fountains, &c., being less costly by far than bronze, and even than stone when richly carved; while, unlike the latter and terra-cotta, it defies frost.

In architecture its use could be largely extended. A work in lead of a novel character is the covered bridge over Northumberland Street connecting the Grand Hotel with its annex, carried out for Mr. William Woodward and illustrated in the article on metal-work of the tenth edition of the *Encyclopædia Britannica*.

With the present tendency towards a fireproof girder construction for streets of offices and shops the fronts might be almost entirely of lead and glass with a backing of cement, or teak if necessary. An advantage of lead panelling is that it can be attached direct to the iron joists, as in the bridge, without support from below. It may also be left undecorated or can be painted. The advantages of this entirely metal treatment for shops, where as much as possible of the space available is required to be of glass, are obvious.

It is impossible to devise anything more suitable than lead for the external construction of winter gardens or orangeries attaching to country houses, hitherto usually left to the taste of the horticultural builder. Lead holds no damp, provides no shelter for insects, and never requires painting; it also remains intrinsically worth a large proportion of its prime cost. Such buildings would be susceptible to endless varieties of treatment.

\* Among the illustrations were two figures of a set of four for a garden, modelled by Mr. Stuart for casting in lead. —[Ed.]



FIG. 5.—LEADEN BRIDGE OVER NORTHUMBERLAND STREET, STRAND.  
 Executed for Mr. Wm. Woodward [A.] by Messrs. Starkie Gardner & Co.



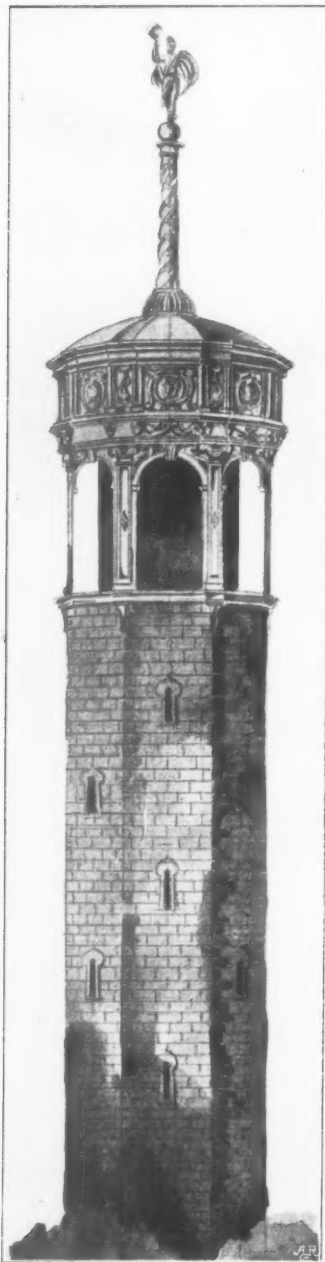


FIG. 6.—LEAD TANK WITH GIRQUETTE FOR A WATER-TOWER.

Again, for entrance lodges in woodland districts, where half-timber construction is desirable, or for riverside residences exposed to floods, a lead sheathing would be particularly appropriate and picturesque.

Finally, for monumental purposes, lead is in many cases more appropriate than bronze, and should be produced for half the cost. Especially is this the case where water is in question. The reservoir or tank surmounting a water tower might be of lead treated picturesquely with the tower of brick. Fountains of lead in open spaces, and for use, have an old-world look.

This Paper is a plea by a metal-worker for the restoration of one of the ancient metal crafts. Lead is, as we have seen, a metal which has been intimately associated with English life, even before the art of building had come into existence, and is peculiarly adapted to our climate. The lead mines, once dotted over almost the whole of the outcrop of archæan rocks from Cornwall to Caithness, are now moribund, and await some impulse from without to regalanise them into life. No body of men could more rapidly influence this result than the important Institute I have the honour to address.

Our consumption per annum of lead is roughly 220,000 tons, of which 200,000 are imported and 20,000 produced at home; and its price per ton to-day may be taken at £10. British production has steadily diminished during the last twenty-five years from over 80,000 to about 20,000 tons, *pari passu* with a gradual decline in price from £20 per ton to £10. To restore our mines the price must perhaps be restored to its former level. With our present increased wealth and population, it may be assumed that our lead production would rise to 100,000 tons, leaving 120,000 still to be imported. This at £20 per ton would cost £2,400,000, of which half would go to the Exchequer, the net result being that we should pay the foreigner less by £800,000 than at present, while our own industrial population, winning 100,000 tons of lead at £20 per ton, instead of 20,000 tons at £10, would be enriched by £1,800,000 per annum. Thus, through the consumer paying 4d. per lb. for lead, as he was content to do twenty-five years ago, the Exchequer would be richer by £1,200,000; £800,000 would be kept in the country; an industry dying out would be rendered flourishing; and an extra £1,800,000 would be distributed among our industrial class, finding athletic outdoor employment for fully 10,000 operatives.

## DISCUSSION OF MR. STARKIE GARDNER'S PAPER.

MR. JOHN SLATER, *Vice-President*, in the Chair.

MR. R. PHENÉ SPIERS, F.S.A. [F.], referring to the Palace of Nonsuch, said that in a Paper read at the Institute by Mr. E. T. Robinson many years ago it was claimed that all the decoration of the exterior was done in that plaster to which Mr. Gardner referred as having been introduced from Italy. He should be quite willing to agree with Mr. Gardner that the bas-reliefs which decorated the palace of Nonsuch would have been infinitely better in lead than in plaster, but he would like to have more evidence as to their being in the former material. Having Mr. Robinson's Paper in mind, he had questioned how such plaster decoration could have been protected sufficiently to last such a long time. In parts the decoration was not protected by projecting gables such as are found in many English houses where plaster decoration exists. Throughout France, in the beautiful roofs, gable-ends, finials, &c., lead seemed to have been employed decoratively to a much greater extent than was the case in England. He remembered seeing at Rouen three or four massive finials, some six or eight feet high, which were also beaten in lead. He only saw them in the Museum; but raised aloft in their position at the end of a gable they would be very prominent and important features. With regard to the Roman lead coffins Mr. Gardner had referred to, there were two or three in the Louvre, brought over, he believed, by M. Ernest Renan from Syria, with precisely that decoration of bead and reel as described. He had often noticed the little bridge across from the Grand Hotel at Charing Cross to the opposite building, and it had never occurred to him that it was in anything else than stone. It was a graceful little structure, and very well decorated. It was interesting to hear that such a feature could be produced absolutely fire-proof, and in a lasting material. Mr. Hall, who had just left the meeting, had told him that he would do his best to introduce lead in a water-tower. That might give Mr. Gardner some hope, for Mr. Hall had had many water-towers to build; and if the result of the Paper was to induce some architects to employ lead to a greater extent than had hitherto been done—to revive, in fact, an old manufacture—he was sure Mr. Gardner would not regret the time he had given to its elaboration. He begged to move that a very hearty vote of thanks be given to Mr. Gardner. He had been occupied with this subject for five or six years at the least, thinking in what way he could bring the material into greater prominence for decorative work.

MR. ERNEST GEORGE [F.], in seconding

the vote of thanks, said he had been very much delighted with the Paper and illustrations, and hoped they would be wiser in their use of the metal.

MR. MAURICE B. ADAMS [F.] asked Mr. Gardner how large he proposed the sheets of cast lead for metal-cased architecture should be made, supposing such buildings as he suggested should be erected. Mr. Gardner's suggestion appeared to be a good one. In many of our commercial buildings the multiplication of voids, as compared with the structural part of their façades, was gradually making the proper and adequate treatment of the intermediate spaces a matter of some difficulty. In the application of lead the size of the sheets had always been an awkward matter. If they were enriched with ornament some of the parts would be rather heavy, and would require some special fixing; and although pilasters would be employed to cover the butt joints of the two sheets, it would be useful to know how large these sheets could be easily made, and what was the best way to fix them, so as to exclude the weather and give full play to the expansion and contraction of the metal. Mr. Gardner had not mentioned the "de-silverisation" of lead, and why it was that in manufacturing lead its makers seemed to take all the silver and arsenic out of it, so that, instead of assuming the white and silvery-grey appearance which made the old spires of Long Sutton and others in Lincolnshire and elsewhere look so charming, the metal assumed a horrid black tone which was aggravated by the builders nowadays putting turpentine to perpetuate that dismal colour. He would like to know whether there were any manufactories where the lead could be purchased in its genuine form; and whether it would be dearer than the ordinary lead? As to the artistic treatment of lead, it must vary with people's tastes; they must, however, get out of the mechanical way in which almost all materials were nowadays applied. One had but to look at the old spires and old roofs to find how irregularly their details were devised: instead of having the roll on the top of the edge to give a uniform and straight line, the timber itself varied slightly, giving a wavy, ridged line, and the rolls were carried right up to the ridge and allowed to break the sky-line; instead of having the longitudinal roll, which was now almost always introduced, the lead was simply brought up to lap over on the other side. He was aware that there was danger of the wind-catching large sheets of lead. Lord Grimthorpe, he believed, had had some difficulty with the creeping of the lead on St. Albans

Abbey, because he would not do it in the way Mr. Longmire proposed to have it done, and as a matter of fact much trouble was involved subsequently. These were points which had to be considered by the old builders in putting up the immense spires like the one over old St. Paul's Cathedral, which was burnt down many years before the Fire (1561). This spire, he believed, was 520 feet high above the ground, and was covered entirely with lead. The wind pressure on those old spires must have been tremendous, and the way the lead was clipped or fixed down was necessarily a matter of extreme importance.\*

Mr. HOWARD SETH-SMITH [F.] said he supported the vote of thanks very heartily. They had been listening, he supposed, to their greatest archaeological authority on metal work; he did not know whether he was not the greatest international authority on the subject; certainly he was the greatest in England; and it was extremely interesting to have his experience and his taste to guide them. One hoped that the suggestions thrown out might be made use of by their younger architects as well as by the older ones so far as it became possible. As to the colour of lead, he sympathised with Mr. Maurice Adams thoroughly; on turrets and other roof features it was most unsatisfactory owing to the way the lead was prepared now. Lately in Frankfort, looking at the half-timbered buildings in the old square, he remarked especially the lovely effect of the lead lace-work on the verges of the gables. Nothing could be more beautiful than the refined line given by this lead-work with all its rich detail. He had passed, too, a building in London the other day, designed, he believed, by Messrs. Niven and Wigglesworth—a Sailors' Institute by the East India Dock Road, where lead appeared to have been freely made use of, and with very charming effect: it was introduced into the panels of the front over the main entrance. Mr. Starkie Gardner had mentioned the use made of lead in the production of sundials, also the balustrades to staircases, some of which were very charming in London. They would be glad to have Mr. Gardner's views as to wetting the lead, instead of using rolls, which were usually so very ugly, especially of the size builders now adopt. The low relief of the wetting was so much more beautiful that it might be well to adopt it instead of putting the rolls on, especially in features of small scale.

Mr. E. W. HUDSON [A.] said Mr. Gardner's idea as to the application of lead to the upper part of a water-tower was a very practical and

\* With regard to the lead casing of "Nonsuch," mentioned by Mr. Gardner and questioned by Mr. Phené Spiers, it may be interesting to note that Pepys describes the building as sheeted with lead. He was there in 1665, and says, "One great thing is that most of the house is covered, I mean the posts and quarters in the walls, with lead and gilded."—M. B. A.

interesting one. When, however, anything like lead was applied to a fountain at or near the level of the ground, he was afraid they would run the risk of having the delicate part of the work at any rate damaged by the juveniles, or stripped off and taken away by thieves. He was interested to hear Mr. Gardner bring in the instance of the tower of St. John's Priory, Clerkenwell. He had often wondered what Stowe's description referred to; it seemed to him to refer to some graven and enamelled panelling, such as mosaic, and not to anything in the nature of lead-work.\* They all remembered the notable application of lead to statuary in the negro that used to stand in Clement's Inn. What had since become of it he did not know. He believed lead was used considerably in the Middle Ages for images of saints, &c. A small lead image was found in an old sewer close by St. John's Gate in 1860; † Louis XI. used to carry such little images in his hat.

THE CHAIRMAN, in putting the vote, said that some of the illustrations made them regret that they had not now in London anything, for example, so charmingly picturesque as the view given of Goldsmiths' Row. He agreed with Mr. Adams with regard to the desilvering of lead; there was no doubt that the lead now used for roofs was very different in quality from that used

\* It had not occurred to me, until Mr. Gardner suggested it, that the decoration of the tower of St. John's Priory, Clerkenwell, referred to by Stowe, might have been of metal. I do not, however, know of any evidence whatever for its being of lead, but as to its position one may gather from his description that it was on the higher part of the tower and visible for some distance away. It may, therefore, have been of the nature of cresting, *flèche*, or spire. Stowe writes: "The great bell tower (a most curious piece of workmanship, graven, gilt, and enamelled, to the great beautifying of the city, and passing all other that I have seen) was undermined and blown up with gunpowder, &c." We are unable to tell what was the style of architecture or what the date of this tower. There is, I believe, no drawing of it extant, but it would appear from the force required to destroy it that it was a large and well-built structure. It dated most likely from the end of the fourteenth century (after the destruction of the Priory under Wat Tyler), or at the end of the fifteenth century, when Prior Docwra completed the buildings. It is not so likely to have been of the twelfth century, the date of the foundation, unless it escaped the fire; but if this improbable supposition were a fact, we should not expect to find an elaborate metallic finish to the roof unless a story had been subsequently added. I believe it to have stood just to the north-west of the nave of the church (without being actually part of it) where Jerusalem Passage enters St. John's Square, and certainly not at "a crossing," as some writers have surmised. The late Mr. H. W. Brewer's picturesque and imaginative drawing is quite unreliable, as are also the re-issues of Van den Wyngerde's and Newton's bird's-eye views. Stowe does not mention lead as the material used for the "graven and enamelled" work, and any evidence as to its actual composition would be of great interest.—E. W. H.

† This was a small image of Christ, once part of a crucifix. It may or may not have once belonged to some inmate, but without connection with the architecture.—E. W. H.

200 years ago. As to putting up towers, turrets, and elaborate erections in a perishable material, and covering them with an imperishable material such as lead, he was not sure whether the effect of that covering would be as permanent as some seemed to think. It had been his experience, in treating an old house where there had been a timber turret covered with lead, to find that the lead had cracked in several places, and had not been looked after; consequently the water had got in and caused the timbers behind to rot in a most disastrous manner. The treatment Mr. Starkie Gardner had alluded to, of covering concrete and metal material with lead, would undoubtedly prevent that, and seemed to be quite a feasible method of using lead construction. With regard to the size of the sheets he thought that in any treatment of lead as surface decoration they must not have too large panels.

Mr. STARKIE GARDNER, in reply to Mr. Spiers, said that he had spent almost two days in looking over the accounts of the building of Nonsuch, and had found that plaster of Paris was used there, which was a gypsum plaster, and of no use for external work. From what he had read, he did not think that any kind of plaster was known at that time which would have been available for modelled panels; and, although there was some doubt about the exact meaning of the descriptions, he did not think, by the light of the earlier buildings in Goldsmiths' Row, there could be any doubt that the whole of the decorative work of Nonsuch was actually cast lead-work. The figures were clearly so—in fact, the account as good as stated that all the decoration to the upper stories was lead. He had not had very much experience in lead construction; the largest work he had had to do was the bridge across Northumberland Street, and in that case he had cast panels—cast in sand in an open mould, just as the old firebacks were. So far as he could recollect, the size of the panels would have been about 4 feet by 3. But there was no difficulty whatever in casting lead; if they had enough heated metal and enough caldrons to pour from, they could run the casting over a panel of 10 feet. He did not, however, recommend cast panels of such large size because of their unwieldiness, and, moreover, he did not think there would be any advantage in doing what would to a great extent be a *tour de force*. There was no better fixing for lead than by screws, screwing it to the iron. But care must be taken to give an amount of play; the screw-holes should be elliptical, so that the lead might move on the fixings; otherwise there would be a tendency to buckle in changes of temperature. Their aim should be to get the panels as thin as possible. Where there was a good deal of relief one had less control over it,

but for flat bas-relief it could, he thought, be run a quarter of an inch.

Mr. ERNEST GEORGE: May the lead safely touch the iron?

Mr. STARKIE GARDNER: Certainly. There was no action between lead and iron unless there was water between them. Dry junction had no effect whatever; there was no galvanic action going on except water were present. The oxide—that white colour that came to old lead—was a very curious thing. He could not conceive that it could be due to silver, because they all knew that silver oxide was black, and he did not think the presence of silver could possibly affect the oxidation of lead. Very possibly arsenic might; he should think it would not be beyond the bounds of science to start that white oxide, if necessary, by a chemical application of an oxidising agent. Any chemist of experience would probably be able to suggest a means of starting it, just as the green oxide on copper could be started. He agreed that it was a great drawback to lead that it should assume that black colour; but he expected that it would pass off with age and become of the proper white that they admired. As regards wetting lead, the drawback to actually joining the joints was the change of temperature. It was necessary to allow a means of contracting and expanding, and that could only be done by some kind of loose joint that was rolled over and watertight. The moment the joints were burned together, buckling and trouble were bound to ensue, so that he had always advocated either strips of lead to cover the joints or lapping the edges one over the other in a way that would admit of movement. In reply to Mr. Hudson he would not suggest that parts of a fountain that could be kicked by children and played with should be of lead. There should always be a stone basin, or something in front to hold the water, and the lead-work could be behind the water where it could not be tampered with and injured. Stowe, unless he had misread him, particularly stated that the tower of St. John's was of lead; that the whole of the work that was decorated and painted and was so beautiful was the lead portion of it. It was not really enamelled, but it had the effect of enamel. It must have been painted, and perhaps painted over gilding in some way to give it that sort of look. There was no doubt that the French always, or in very many cases at least, tried to produce the effect of enamel work on their cathedral roofs. The negro figure that used to be in Clement's Inn had been removed to the Temple, and was in the Temple Gardens now. There were a good many contemporary replicas of it dotted about the country. It was one of the stock models, although it was one of the most beautiful of them.





9, CONDUIT STREET, LONDON, W., 23rd Jan. 1904.

## CHRONICLE.

### The President's "At Home."

The President's first "At Home" this session took place in the rooms of the Institute on Monday, the 11th inst. These reunions were originated by the President at the beginning of last session, their object being to give members an opportunity of becoming better acquainted with one another, and to bring them together in more genial and friendly intercourse than is possible at any of the regular functions of the Institute. The general feeling among all present on these occasions is that no more delightful means of achieving such an object could be devised. The President's hospitality at this the third event of the kind was enjoyed by little short of four hundred and fifty members, London and provincial—perhaps the largest company of Fellows and Associates ever assembled at one time within the walls of the Institute. At the previous "At Homes" drawings were shown representative of the works of the late J. F. Bentley and W. Eden Nesfield; at the last, the architect of Truro Cathedral, the late John Loughborough Pearson, R.A., was represented—a numerous collection of his drawings having been kindly lent by his son Mr. J. L. Pearson [F.]. The following is a list of them:—

Astor Estate Office—64 sheets.  
 St. Stephen's, Bournemouth—20 sheets.  
 Cliveden Hall and Staircase—8 sheets.  
 Cambridge University Library—6 sheets.  
 Dalton Holme Tower and Spire—1 sheet.  
 Freeland Church, Reredos and East Window—1 sheet.  
 Sidney Sussex College, Cambridge: elevations—6 sheets.  
 Flagon and Cup—1 sheet.  
 Headingley Pulpit—2 sheets.  
 Hove Parish Church—13 sheets.  
 St. Augustine's, Kilburn—7 sheets.  
 Ditto, Reredos—1 sheet.  
 Lechlade Manor House—4 sheets.  
 St. Agnes', Liverpool—9 sheets.  
 Ditto, Reredos—1 sheet.  
 All Saints' Church, Maidstone—1 sheet.  
 Middlesex Hospital Chapel—2 sheets.  
 Manningham Bruce Church, Reredos—1 sheet.  
 Peterborough Cathedral—8 sheets.  
 St. John the Evangelist, Red Lion Square—2 sheets.

Truro Cathedral—11 sheets.  
 Ditto, Pulpit and Reredos—2 sheets.  
 Thurstaston Church, Reredos—1 sheet.  
 St. George's, Windsor: Altar Cross—1 sheet.  
 Westwood House—2 sheets.  
 Westminster Hall—5 sheets.  
 St. Peter's, Vauxhall: Pulpit and Chancel Screen—9 sheets.

Mr. Pearson, who was a Royal Gold Medallist of the Institute, died in December 1897 at the age of eighty-one, and was buried in Westminster Abbey. Some of his works and drawings are illustrated in the Memoir by Mr. W. D. Caröe which appeared in the JOURNAL for 8th January 1898.

## THE PRIZES AND STUDENTSHIPS 1904.

### Deed of Award.

The Designs and Drawings submitted for the Institute Prizes and Studentships are now on exhibition in the Gallery of the Alpine Club (entrance in Mill Street, Conduit Street, W.). The exhibition is open every day from 10 A.M. till 8 P.M. until it closes on the 30th January. The Presentation of Prizes takes place on the 1st February.

The Council's Deed of Award, made under seal pursuant to By-law 66, and read at the General Meeting of the 18th January, states that the Council have examined the works submitted for the Institute Silver Medals, the Soane Medallion, the Owen Jones and Pugin Studentships, the Godwin Bursary, the Tite Prize, the Arthur Cates Prize, and the Grissell Gold Medal, and gives particulars of the competitions and the results thereof as follows:—

### THE ROYAL INSTITUTE SILVER MEDALS.

#### (i.) *The Essay Medal and Twenty-five Guineas.*

Eight Essays on "The Delineation of Architecture" were received for the Silver Medal under the following mottoes:—

1. Alpha.
2. "Ars longa, Vita brevis."
3. Bothwell.
4. "Floreat semper fidelis civitas."
5. "Fortuna sequatur."
6. "Resurgam."
7. "The 9th."
8. X.

The Council regret that they are unable to award the Medal, but they have granted a Medal of Merit and Ten Guineas to the author of the Essay bearing the motto "X" [Claude Batley, Little Roundwood, Ipswich].

#### (ii.) *The Measured Drawings Medal and £10. 10s.*

Twelve sets of Drawings were sent in of the various buildings indicated, and under mottoes as follows:—



1. Archer:—6 strainers (St. Paul's Church, Deptford).
2. Baydo:—5 strainers (Morden College, Blackheath).
3. Caylix:—6 strainers (St. George's Church, Hanover Square).
4. Conger Eel:—4 strainers (Lady Chapel, Lichfield Cathedral).
5. Dolphin:—5 strainers (Church of St. Oswald, Ashbourne, Derbyshire).
6. En avant:—3 strainers (The Queen's House, Greenwich).
7. Erin:—4 strainers (St. Nicholas' Church, Old Shoreham, Sussex).
8. Gothic:—5 strainers (Tideswell Church, Derbyshire).
9. Steeple-Jack:—6 strainers (Christ Church, Newgate).
10. Thane:—6 strainers (Glamis Castle, Forfarshire).
11. The Birds:—5 strainers (Priory Church of St. Mary and St. Blaise, Boxgrove, Sussex).
12. Vis:—6 strainers (St. James's Church, Piccadilly).

The Council award the Silver Medal and Ten Guineas to the delineator of the Church of St. Oswald, Ashbourne, Derbyshire, submitted under the motto "Dolphin" [*Laurence M. Gotch, 62 Lynton Avenue, West Ealing, W.*], and Certificates of Hon. Mention to the delineators of Tideswell Church, Derbyshire, and St. James's Church, Piccadilly, submitted under the respective mottoes of "Gothic" [*G. S. Salomons, Prudential Chambers, 78 King Street, Manchester*] and "Vis" [*C. Lovett Gill, 17, Albert Street, Regent's Park*].

#### THE TRAVELLING STUDENTSHIPS.

##### (i.) *The Soane Medallion and £100.*

Fourteen Designs for a University Theatre were submitted, under the following mottoes:—

1. Aspirant:—7 strainers.
2. Dom:—6 strainers.
3. Gable Endie:—5 strainers.
4. Hal:—6 strainers.
5. Ionian:—5 strainers.
6. Jonah Man:—7 strainers.
7. Oxon:—7 strainers.
8. Phoenix:—7 strainers.
9. Rannock:—5 strainers.
10. Rotunda:—7 strainers.
11. Sanctus Boscus:—7 strainers.
12. Star (device):—4 strainers.
13. Tay:—7 strainers.
14. X:—7 strainers.

The Council have awarded the Medallion and (subject to the specified conditions) the sum of One Hundred Pounds to the author of the design bearing the motto "Oxon" [*Frederic J. Horth, 1, Cavendish Square, Hull*], and a Certificate of Hon. Mention to the author of the design bearing the motto "Gable Endie" [*David Smith, 33, Albert Square, Dundee, N.B.*].

##### (ii.) *The Owen Jones Studentship and £100.*

Five applications were received for the Owen Jones Studentship from the following:—

1. W. Davidson:—6 strainers.
2. L. R. Guthrie:—6 strainers.
3. James McLachlan:—6 strainers.
4. Frank Lishman:—6 strainers.
5. H. Morley:—6 strainers.

The Council have awarded the Certificate and (subject to the specified conditions) the sum of One Hundred Pounds to *Mr. W. Davidson, 121, Gilmore Place, Edinburgh*, and a Medal of Merit to *Mr. H. Morley, 66, Sydney Street, S. Kensington, S.W.*

##### (iii.) *The Pugin Studentship and £40.*

Three applications were received for the Pugin Studentship from the following:—

1. A. E. Bullock:—2 strainers.
2. W. S. A. Gordon:—6 strainers.
3. F. C. Mears:—6 strainers.

The Council have awarded the Medal and (subject to the specified conditions) the sum of Forty Pounds to *Mr. F. C. Mears, 65, Sydney Street, S. Kensington, S.W.*, and a Medal of Merit to *Mr. W. S. A. Gordon, 65, Wellmeadow Road, Hither Green, S.E.*

##### (iv.) *The Godwin Medal and £65.*

Two applications were received for the Godwin Bursary from the following:—

1. H. Phillips Fletcher:—6 strainers.
2. F. R. Hiorns:—6 strainers.

The Council have awarded the Medal and (subject to the specified conditions) the sum of £65 to *Mr. H. Phillips Fletcher [F.]*.

##### (v.) *The Tite Certificate and £30.*

Eleven Designs for a Crescent in a large City were submitted under the following mottoes:—

1. Angliæ:—3 strainers.
2. Antiquum Obtinens:—3 strainers.
3. Bridge:—3 strainers.
4. Bydand:—3 strainers.
5. Colonnade:—3 strainers.
6. Canny Alnwick:—2 strainers.
7. Crescent (device):—3 strainers.
8. Fleur-de-Lis (device):—3 strainers.
9. Pecksniff:—3 strainers.
10. Porthos:—3 strainers.
11. Red Shield:—3 strainers.

The Council have awarded the Certificate and (subject to the specified conditions) a sum of Thirty Pounds to the author of the design bearing the motto "Bridge" [*Heaton Comyn [A.], 14, Great Ormond Street, W.C.*], and a Medal of Merit to the author of the design bearing the motto "Porthos" [*Arthur D. Nicholson, 19, Royal Crescent, Glasgow*].

##### THE ARTHUR CATES PRIZE: £40.

Four applications for the Arthur Cates Prize were received from the following gentlemen:—

1. J. H. Gibbons:—11 strainers.
2. Baxter Greig:—15 strainers.
3. F. Winton Newman:—11 strainers.
4. John Swarbrick:—18 strainers.

The Council regret that they are unable to award the Prize, but they have granted the sum of Twenty Guineas to *Mr. F. Winton Newman, 58,*

*Savernake Road, Hampstead, N.W., and a Certificate of Hon. Mention to Mr. Baxter Greig [A.], 188, Dulwich Grove, Dulwich, S.E.*

#### PRIZE FOR DESIGN AND CONSTRUCTION.

*The Grissell Gold Medal and £10. 10s.*

Fourteen designs for a Timber Spire or Lantern Termination were submitted under the following mottoes:—

1. Cardon:—3 strainers.
2. Carpenter:—1 strainer.
3. Celt:—1 strainer.
4. Dew:—2 strainers.
5. Eihera:—3 strainers.
6. Ich Dien:—2 strainers.
7. Le Nord:—1 strainer.
8. Mente Manuque:—2 strainers.
9. Oak:—3 strainers.
10. Opal:—2 strainers.
11. Simplex:—2 strainers.
12. Skyline:—3 strainers.
13. Wee Macgregor:—3 strainers.
14. Yddraig Goch:—1 strainer.

The Council have awarded the Medal and Ten Guineas to the author of the design bearing the motto "Cardon" [J. William Hepburn, 88, Patsall Road, N.W.], and a Medal of Merit to the author of the design bearing the motto "Ich Dien" [Arthur Jas. Barclay, 343, Union Street, Aberdeen, N.B.].

#### THE ASHPITEL PRIZE 1903.

The Council have, on the recommendation of the Board of Examiners (Architecture), awarded the Ashpitol Prize to Mr. F. Winton Newman, of London. Mr. Newman was registered *Probationer* in 1895, *Student* in 1897, and passed the Final Examination in November 1903.

#### THE TRAVELLING STUDENTS' WORK.

*Soane Medallist* 1902.—The Council have approved the drawings executed by Mr. James B. Fulton, who was awarded the Medallion in 1902, and who studied in Italy, Gibraltar, Algiers, Malta, Egypt, Palestine, Turkey, Greece, Austria, Hungary, and Germany.

*Tite Prizeman* 1902.—The Council have approved the work of Mr. Charles Gascoyne, who was awarded the Tite Prize of 1902, and who studied in Italy.

*Tite Prizeman* 1903.—The Council have approved the work of Mr. David Smith, who was awarded the Tite Prize for 1903, and who studied in Italy.

*Pugin Studentship* 1903.—The Council have approved the work of Mr. J. Harold Gibbons [A.], who was elected Pugin Student for 1903, and who studied in Gloucestershire and Somersetshire.

The Deed of Award, bears date 18th January 1904, and is signed by John Slater, *Vice-President*; Ernest George and R. S. Balfour, *Members of*

*Council*; Alexander Graham, *Hon. Secretary*; W. J. Locke, *Secretary*.

#### The late Henry Saxon Snell [F.].

Mr. Saxon Snell, whose death occurred on the 10th inst. in his 73rd year, had been a Fellow of the Institute since 1873. He was the son of Mr. George Blagrove Snell, of London, and entered the office of Sir James Pennethorne, afterwards becoming assistant to Sir Joseph Paxton, and then to Sir William Tite. In 1851 he gained the Royal Academy Silver Medal for his measured drawings of the steeple of St. Mary-le-Bow, Cheapside. About 1866 he was appointed architect to the St. Marylebone Board of Guardians, in which capacity he began the reconstruction of the Marylebone Workhouse. Among his principal architectural works were the Boys' School for the Royal Patriotic Fund, Wandsworth; the Convalescent Home for Children, Norbiton; the Holborn Union Infirmary, Highgate Hill; St. Olave's, Tooley Street, Union Infirmary; St. George's, Hanover Square, Union Infirmary; Casual Wards, Marylebone Workhouse; Marylebone Swimming Baths; Infirm Wards and administrative offices for St. Luke's Workhouse in City Road and Shepherdess Walk. In 1887 his designs were adopted for a conversion of the front main building of the Aberdeen Royal Infirmary for administrative and clinical purposes only, and for the removal of all the patients into new pavilions at the rear. He was architect, jointly with Mr. Alfred Williams, of the Kensington Infirmary, and assisted the late Captain Fowke, R.E., on the Dublin Exhibition. Mr. Saxon Snell was afterwards for some years in partnership with his son, Mr. Alfred Saxon Snell, under the style of H. Saxon Snell and Son, and thus constituted the firm carried out extensive works for various Metropolitan Boards of Guardians. A full list of these works appears in *The Builder* for the 16th inst. Mr. Snell retired from practice about seven years ago.

#### National Registration of Plumbers.

From the Plumbers' Company has been received a facsimile of the portable certificate, or registration ticket, for the year 1904, issued by the Company to registered plumbers. It folds in two about the size of a lady's visiting-card, and bears the number of the certificate, the name, address, and signature of its holder, and the signature of the Clerk of the Company. In the chief cities and towns of the United Kingdom the certificate bears the signature of the secretary to the local district council. The colour of the date printed across the face is varied each year to facilitate identification. It is requested that complaints, if any, of work done by registered plumbers should be addressed to the Company.

## REVIEWS.

## EGYPTIAN ARCHITECTURE.

*L'Art de bâtir chez les Egyptiens. Par Auguste Choisy. Sm. fo. Paris. 1904. Price 20 francs. [Edouard Rouveyre, 76, Rue de Seine, Paris.]*

When in 1866 I was measuring the theatre of Bacchus at Athens, which at that time had not long been discovered, I found another "chiel takin' notes," with whom I entered into conversation in the course of the afternoon and again on the following day. A few years ago I chanced to refer to the hasty and illegible diary which I kept during my tour, and found the following entry: "Made the acquaintance at the French Academy of an engineer of the Ecole des Ponts et Chaussées, a young man of 23 or 24, remarkably intelligent, and full of theories on all possible points connected with the buildings in the Acropolis, &c. He has, I believe, already written many essays about them which have received the approval of the Institute of France." That young man was Monsieur Auguste Choisy, the distinguished French author, whose works on *L'Art de bâtir chez les Romains* and *L'Art de bâtir chez les Byzantins* have become household words amongst our students in late years.

Among other works, M. Choisy published in 1899 a *History of Architecture*, in two volumes, which is less known, possibly on account of the large number of technical terms in it. In the preparation for this work, which included Egyptian architecture, M. Choisy set forth his views as regards the construction of the Pyramids and Temples, and explained in detail the method of building arches in crude brick without centres, which had already been divined some 12 or 14 years ago. In the new work just published, *L'Art de bâtir chez les Egyptiens*, M. Choisy has returned to the subject, and brought forward a large amount of new material, with minute observations on the various methods adopted by the Egyptians, both in the construction of their stone temples and of their made brick walls and storehouses. In addition to over 100 copper-plate engravings introduced in the text, M. Choisy has added 48 photographs which are of great value, not only because they confirm the views set forth by the author, but as representing subjects and points of view which the amateur or professional photographer would have deemed unworthy of the camera. From M. Choisy's point of view unfinished portions of building and faulty construction are of much greater value to him as exceptions to the rule by which he proves his theories to be well founded.

M. Choisy generally manages to condense into a single page that to which most writers would devote a whole chapter, the result being that in about 180 pages of text, with an average of

20 lines to the page, he has compressed an amount of matter on which many volumes might have been written.

The two most important discoveries in this volume are, first, the reasons why in certain great walls of crude brick at Abydos and Karnak, the courses, instead of being horizontal, are laid in undulating or wavy beds; and, secondly, the machines and the methods adopted by the Egyptian masons to raise their stones into position.

As regards the first, the undulating courses have hitherto been ascribed either to settlement of foundation or to an attempt to prevent destruction by earthquakes; but M. Choisy points out that in some cases they are built upon rock, where no settlement would take place, and earthquakes very rarely occur in Egypt. Having noticed that the walls built in waving courses were invariably near the Nile or some inland lake, whereas high up or in the desert the courses were horizontal, M. Choisy came to the conclusion that the precautions taken by the Egyptians were deemed necessary because, with water in proximity, the moisture from below was drawn up into the brickwork by the heat of the sun in the daytime, and at night this moisture condensed and the crude bricks increased in bulk. If the walls were built on a slope, the lower surfaces being moist there was a tendency to slip, and in any case the swelling of the bricks might cause cracks. To obviate these dangers, if a concave bed were given to portions of the wall it would prevent slipping, and by leaving at intervals open vertical joints, these joints were closed up by the hygrometric changes in the brick.

In order to raise the blocks of stone M. Choisy gives, amongst others, examples of two levers—(A) a series of levers side by side with a heavy counterpoise; and (B) an assemblage of timber which he calls *l'ascenseur oscillant* (oscillating cradle). This machine (of which he says there are twenty-one examples in the Louvre) is represented in the British Museum by a small model only, which was found in a tomb. This model has always been assumed to be one of a centre on which arches were built; but, as M. Choisy has proved that all their vaults were built without centering of any kind, it must have served some other purpose. The cradle consists of two beams of timber, of segmental shape, about 6 feet long, framed together at a distance of about 2'6 with stout wooden bars. On the top of the oscillating cradle, the stone, measuring about four feet square by 2'6 high, was shifted by means of an inclined plane, and then, by means of levers and two or three blocks of stone, introduced one after the other under the cradle, the stone was raised and shifted on to the upper bed, the limit of height of the same being about 5 feet. This is the height established in the Great Pyramid, and the cradle is the inter-

pretation which M. Choisy puts on the description given by Herodotus, who says that the machine for raising the stones from one level to another was made of small pieces of wood. As Herodotus's description was given to him by the priests, it is the principle rather than the exact form taken by the machine on which, as M. Choisy suggests, we have to rely. On the other hand, the model in the British Museum is probably from 2,000 to 1,500 years later than the Great Pyramid, so that the methods employed in raising the blocks in the latter continued in use up to and probably including the Roman domination.

Up to the present day it has always been assumed that inclined planes formed the only scaffolding employed by the Egyptians; but M. Choisy points out that at Karnak, where the temples are planted so close one to the other, there would be no room for the immense extension of these inclined planes. He suggests, therefore, as an alternative, the temporary erection of a series of step-platforms similar to those which formed the actual kernel of the Great Pyramid, and he brings forward, in corroboration of his theory, photographs representing the remains of the temporary platform which was erected in the great court of Karnak in order to build the Pylon and the adjoining colonnade. These remains have usually been regarded as works of late date when those courts were taken possession of by squatters who settled in the precincts of the temple; but M. Choisy gives a photograph of one, and of the colonnade which adjoins the Pylon, and here one notes that the capitals of the columns still remain *en bloc*, and have never been worked down to their proper shape (*ravalés*). For some unknown reason the work was stopped and the colonnade was left unfinished. It is by minute observations of this kind that M. Choisy has been able to reveal to us the methods of construction employed by the Egyptians from the earliest times, and those to which we have drawn attention form a small portion only of his great treatise.

In the last pages of his work M. Choisy summarises the methods employed by other nations. Thus the prehistoric people who erected the menhirs and dolmens in various parts of England and at Carnac in Brittany worked according to the Egyptian method, as also the Phœnicians at Baalbec; and, following the sculptural representations in their bas-reliefs, the Assyrians.

The descriptions given in Vitruvius (x. 6) and Pliny (xxxvi. 21) suggest, according to M. Choisy, that the methods of construction in the Temple of Ephesus were only partially Egyptian, and at Selinus in Sicily he says nothing exists of Egyptian precedent.

The beauty and simplicity of M. Choisy's illustrative diagrams in the text have already been appreciated in his other works, but his photographic

reproductions are new and will be of inestimable value, not only as supporting his theories, but as records of Egyptian construction, most of which in course of time may possibly disappear.

R. PHENÉ SPIERS.

## SHROPSHIRE CHURCHES.

*An Architectural Account of the Churches of Shropshire. By the Rev. D. H. S. Cranage. Illustrated with Photographs by Martin J. Harding; and with Ground Plans of the most important Churches by W. Arthur Webb [A.]. Part 6. [Hobson & Co., Wellington, Shropshire, 1903.]*

Mr. Cranage is nearing the completion of his monumental account of the churches of Shropshire, a work which leaves very little for any future architectural historian to add to. Everything noticeable about each church appears to be noticed, and all doubtful points of interest are discussed at adequate length. The descriptions of the buildings are full without becoming prosy, and instructive without being dogmatic. Mr. Cranage is not satisfied with merely recording the features and history of the subjects of his inquiry; he studies them also from the artistic point of view. He considers with a highly cultivated sense of discrimination what is worthy of being admired or the reverse in the work of every age. His open-mindedness and independence of fashionable prejudices are refreshing. The work of no one century is all sacred to him, nor that of another all accursed. The author shows a most happy temper in being able to speak even of things done in the nineteenth century without the incessant bitter railing which gives such an unpleasant as well as monotonous flavour to so much of our recent architectural literature. He has eyes ready to appreciate good work of every age; and, even when justice obliges him to blame results of uninstructed zeal, he is never uncharitable, but always willing to recognise that even what we most disapprove of now was done by men very like ourselves, doing their best according to their own lights.

The "plum" of the present volume is the very interesting church of Acton Burnell, attributed to Bishop Burnell, the great Minister of King Edward I., whose work at Wells is so well known. Among many others the churches of Condover, Alberbury, and the curious little Jacobean chapel at Langley may be mentioned. Everyone interested in the perennial question of the "low side window" should look up the drawings and description of what Mr. Cranage truly calls the very remarkable window of this kind at Church Preen. Mr. Webb's plans and details and the photographic views continue up to the standard of the former parts.

ARTHUR S. FLOWER.



## THE ANCIENT CITY HALLS.

*The Ancient Halls of the City Guilds, drawn in lithography by Thomas R. Way, with some account of the History of the Companies by Philip Norman, F.S.A. 4s. Lond. 1903. [Messrs. George Bell & Sons, York Street, Covent Garden, W.C.]*

On putting down this book after a careful perusal one does so with a slight feeling of disappointment—at least that was my experience. On glancing at the title, and before opening it, I pictured to myself drawings which would at least have put on record the architectural beauties of some of the City halls in an architectural manner, accompanied by descriptions, more or less critical, of their variations in the style of building in vogue just after the Great Fire of London in 1666. Nearly all these ancient halls, as Mr. Norman says in his Introduction, were destroyed, either totally or in part, by this national calamity, and such claims as they have to be “ancient” date from that time.

The drawings themselves are excellent examples of Mr. Way's method of work in lithography, but one cannot help feeling that this method is more effective in suggestions of old bridges across the Thames, and for general sketchy effects in quaint streets, as shown in his drawings in *Architectural Remains of Richmond, Twickenham, &c.*, and in *Ancient Royal Palaces in and near London*, than in the present series, the subjects of which seem to demand a greater clearness in the details than is perhaps possible when executed in the process adopted. A general effect with a careful eye to the pictorial composition is what Mr. Way gives us, and he does this extremely well. In the view of the exterior of Cordwainers' Hall in Cannon Street, for instance, the whole is a charming street scene; but it would be difficult to say which of the buildings was Cordwainers' Hall unless one knew one's Cannon Street very well indeed.

In a book of this kind the letterpress is naturally written for the drawings instead of the drawings illustrating the letterpress. The architectural features are referred to in general terms, whilst a good deal of space is given to “worthies” of the various companies, with their gifts of plate, &c. The historical portion is put in a concise and interesting way, and if the book were a little smaller one could not do better than put it into one's pocket and read it in the quiet courtyards of the various halls whilst studying the buildings; and the drawings would come in excellently well as dreamy reminiscences to be called up after returning home, the studies for the day being ended.

I think Mr. Way is a little hard on the companies in his Preface when he says that there are but few of them who in recent years have resisted the temptation to rebuild their halls, giving over

the frontages to blocks of offices and banks. This is not accurate with regard to a good many of the companies at any rate. Where the halls are approached through courtyards, as they are in some cases, the halls are still there at the back, and the front buildings were probably stables or the clerks' residences on one side of the courtyard. The use for such buildings having disappeared, to replace them with more useful ones was hardly avaricious, but was the right thing to do.

The system of admission to the livery companies by apprenticeship has by no means died out, as is stated, although the apprentices, having promised to serve their masters faithfully, are not called upon to do more than pay an official visit to the Guildhall to have their names enrolled (and pay fees).

I notice a few inaccuracies on reading the chapter on the “Skinners' Hall.” This company does not rank sixth, as stated on p. 64, but alternatively sixth and seventh with the Merchant Taylors', as arranged by the Bilsden decree of 1484. Sir Robert Tichborne was no doubt a great man in his time, but he would hardly have presented a petition for the execution of Charles I. on his own account. What he did do was to present a “petition from London.” The amount spent on cedar for the cedar room in 1668 was £826, not £326, and the hall was not “almost rebuilt” in 1847-48. A good deal of so-called decorative work was done then, but the fabric was not interfered with.

These are, after all, small matters, and do not in the least deduct from the fact that Mr. Way has given us a series of very interesting drawings, and Mr. Norman a charmingly written epitome of some of the more prominent facts in the histories of some of the old City companies. When, however, will some devoted band of students set to work and make measured drawings of all these interesting buildings, with the dates of the various additions and “improvements” marked on them? How valuable such drawings would be for reference a hundred years hence!

W. CAMPBELL JONES.

## PLUMBING.

*Lectures to Plumbers. Second Series. Being a variety of Papers on Sanitary Fittings and their Fitting, Lead-work, Coffin Lining, Hydrostatics and Hydraulics, &c. By J. Wright Clarke. With 236 illustrations. 4s. Lond. 1903. [B. T. Batsford, 94, High Holborn, W.C.]*

This collection of lectures covers a very wide field, albeit the subjects of which they treat are curiously varied and miscellaneous in order and selection. From the fact that each page is divided into two columns, it is probable that the volume under notice is a reprint only from the *Plumber and Decorator*, in which journal, we are told in the Preface, the lectures originally appeared. As



delivered by their author in the first instance, there was very likely no need or intention to follow any particular order, each one dealing with a distinct subject and being complete in itself. It is only when the series is contained under one cover that the desirability of a re-arrangement becomes evident. For instance, it would have been better if the three lectures treating of water-closet apparatus and soil pipes (Nos. 1, 4, and the last) had followed each other consecutively, and the second—devoted to "Lining and covering lead coffins"—placed at the end of the book.

The author is careful to explain that his mission does not involve the preaching of new doctrines—for the broad principles of sanitary science must ever remain constant—but rather the necessity of a full and intelligent appreciation of those truths which are demonstrably unalterable; and he is clearly right in insisting that by such knowledge alone is it possible to avoid at times serious error in our work.

Baths, wash-basins, sinks, milk dairies, household laundries, and much more connected with the plumber's craft are discussed in the various lectures, which are also illustrated—not always adequately, and sometimes poorly—with over two hundred diagrams.

The work also includes lectures on the physical properties of water, hydrostatics, &c., which should prove of value to those who are seriously desirous of acquiring an insight into the scientific aspect of plumbing.

Architects with a keen sense of the æsthetic properties of architecture will be grateful to Mr. Wright Clarke for the sympathy he extends to those who suffer from the unreasoning rigour of some of our by-laws. It is, however, often true that the by-law is less in fault than the official whose business it is to enforce its observance. The opportunities the law affords him, by virtue of his enormous discretionary powers, of displaying his mental vacuity are so fully taken advantage of that the spectacle has ceased to be strange. At the same time it must be admitted that he cannot always help himself, and these are the occasions when we find that the regulations them-

selves—especially in rural districts—are in direct conflict with common sense.

FREDERICK CHATTERTON.

## MINUTES. VI.

At the Sixth General Meeting (Ordinary) of the Session 1903-1904, held Monday, 18th January 1904, at 8 p.m.—Present: Mr. John Slater, *Vice-President*, in the Chair, 25 Fellows (including 9 members of the Council), 30 Associates (including 2 members of the Council), 2 Hon. Associates, and visitors, the Minutes of the Meeting held 4th January 1903 [p. 140] having been read, Mr. G. A. T. Middleton [A.] raised a question as to the accuracy of the Minutes on the grounds (1) that it did not appear thereon that the Resolution moved by himself was seconded; (2) that the Resolution ultimately put from the Chair was not in the words of the amendment proposed by Mr. Macvicar Anderson [F.] and seconded by Mr. Hare [F.]. On the first point, on a suggestion of the Chairman, which was accepted by Mr. Middleton, the words "which was duly seconded" were inserted, so that the passage read: "Mr. G. A. T. Middleton formally moved the first Resolution, which was duly seconded, as above." As regards the second objection, the Chairman stated that the President, as Chairman of the Meeting in question, entirely endorsed the Minutes on this point as being a perfectly accurate record of what transpired. The Resolution, he ruled, was therefore valid, and no alteration thereof could be permitted. The Minutes as amended were then passed and signed as correct.

The Secretary announced the decease of Henry Saxon Snell, *Fellow*, and it was resolved that a vote of condolence be passed to the relatives of the deceased member and entered upon the Minutes of the Meeting.

The following Associates attending for the first time since their election were formally admitted and signed the Register, viz.: Ralph Scott Cockrill (Lowestoft) and Thomas Sedgwick Gregson.

The Secretary having read the Deed of Award of Prizes and Studentships 1904 made by the Council under the Common Seal [p. 158], the sealed envelopes bearing the mottoes of the successful competitors were opened and the names declared.

A Paper by Mr. J. Starkie Gardner on LEAD ARCHITECTURE having been read by the author, and illustrated by lantern slides, a discussion ensued, and a vote of thanks was passed to the author and responded to.

The proceedings then closed, and the Meeting separated at 10 p.m.

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